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summarized on the basis of data and stomach material in possession of the Biological Survey. Five-sixths of the animal food of these birds proves to consist of beetles, caterpillars and grasshoppers which far more than counterbalances the occasional and usually local consumption of grain, peas, etc.—W. S.

**Economic Ornithology in recent Entomological Publications.—**

The output of publications of all branches of the Department of Agriculture has been abnormally small during the present calendar year. Hence we find that only two of those of the Bureau of Entomology contain noteworthy mention of the bird enemies of insect pests. The fruit tree leaf-roller (*Archips argyrospila*) has caused considerable loss to fruit growers in Colorado, New Mexico, and New York. Mr. John B. Gill, the author of the bulletin on this pest states<sup>1</sup> that several species of birds have been observed feeding on the larvæ. These birds are the Bluebird, Western Robin, Catbird, Redwinged Blackbird, Orchard Oriole, Kingbird, Phoebe and the English Sparrow.

In a Farmers' Bulletin<sup>2</sup> on the common white grubs, larvæ of May beetles, and well known serious pests, Mr. John J. Davis gives birds first place among the natural enemies. The Biological Survey has found adults or larvæ of May beetles in the stomachs of more than 60 species of birds, a fact mentioned by Mr. Davis. Some of this author's original testimony is as follows:

"Probably the most important of these enemies are the birds, especially crows and crow blackbirds. Fields of timothy sod have been literally overturned by crows in their search for grubs, and in some fields the grubs were almost exterminated by them. Crows have often been observed following the plow in infested fields, eagerly picking up every grub that was unearthed. Mr. Henry Holzinger, of Lancaster, Wis., said that Crow Blackbirds followed the plow in great numbers where he was turning over a sod field in the spring of 1912. In one instance he watched a single blackbird eat many grubs, apparently its full capacity, and then gather as many as it could hold in its beak and fly away. In this case the bird destroyed in all 20 grubs in about 1 or 2 minutes. This habit of eating a large number of grubs and then flying away with its beak full was reported as a common occurrence with the blackbird. Mr. Fred Nelson, of Tabor, S. Dak., stated that his attention was directed to the unusual abundance of grubs in his field in the fall of 1911 by the blackbirds which came in flocks and followed him as he plowed. He soon learned that they were gathering grubs. After picking up several grubs each bird would fly back to the trees a short distance away and soon return. Thus there was a continuous flight from the trees to the ground and from the ground to the trees. Besides crows and blackbirds practically all of our common birds feed on white grubs or their adult forms, the May beetles." — W. L. M.

<sup>1</sup> Bulletin 116, Part V, U. S. Bureau of Entomology, March 12, 1913, p. 102.

<sup>2</sup> No. 543, U. S. Department of Agriculture, July 18, 1913.